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ABSTRACT

In recent years, T-unit analysis has been applied in second language research to characterize the syntactic nature of linguistic input and to assess the syntactic maturity of the learners' written production. This measure has been seen to provide an objective and reliable method of determining the overall complexity of language samples. However, its validity as a measure and the significance of overall syntactic complexity as a variable have been questioned. These reservations address the question of: (1) the main problems that have been encountered in T-unit analysis in general, and in its application to second language data in particular; (2) the T-unit as a valid measure of language development; and (3) the usefulness of the T-unit analysis. To the criticism that the T-unit analysis does not take error into account, it is argued that an attempt to agree on a definition of error would compromise the ease and objectivity of this analytical process. To the charge that it treats syntax alone, failing to account for communicative strategies, such as circumlocution and style, it is pointed out that T-unit analysis research simply claims that the ability to combine clauses is a characteristic of proficiency, and that growth in this area provides an index of growth in the target language. Finally, T-unit analysis seems useful only beyond a certain level of proficiency, but it provides insights into first and second language development. (AM)

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T-UNIT ANALYSIS IN SECOND LANGUAGE RESEARCH: APPLICATIONS, PROBLEMS, AND LIMITATIONS*

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Since its development by Hunt (1965) as an index of the growth in syntactic maturity of school children's writing, T-unit analysis has been widely applied to measure the overall syntactic complexity of speech and writing samples. It has been used both in cross-sectional descriptive studies and in experimental studies to measure the effect of sentence-combining as a curricular activity designed to enhance normal developmental trends in syntactic maturity. The claim that mean T-unit length is a valid measure of overall syntactic complexity has been supported by O'Donnell, Norris, and Griffin (1967), who noted a close relationship between the length of a T-unit and the number of sentence-combining transformations required to produce that T-unit.

In recent years, T-unit analysis has been applied in studies of second language learning to characterize the syntactic nature of linguistic input (Gaies, 1977; Steyaert, 1977; Chaudron, 1978) and to assess the syntactic maturity of learners' written production (Monroe, 1975; Cooper, 1976; Gaies, 1976; Larsen-Freeman and Strom, 1977; Larsen-Freeman, 1978).

In the case of each study, T-unit analysis was seen to provide an objective and reliable method of determining the overall syntactic complexity of language samples. Nevertheless, the validity of the T-unit as a measure and the significance of overall syntactic complexity as a variable have been questioned.

The present paper is a critical review of arguments for and against T-unit analysis in second language research; suggestions are made about the validity, usefulness, and limitations of this and other measures of overall syntactic complexity.

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Since its development by Hunt (1965) as an index of the growth in syntactic maturity of schoolchildren's writing, T-unit analysis has been widely used to measure the overall syntactic complexity of speech and writing samples, both for first language research and, more recently, for research in second language learning/teaching.[1] Since references to this body of research are readily available elsewhere, I will not in this paper attempt a systematic review of the research. I will simply repeat the argument made for the validity of T-unit analysis in first language research and the rationale for the use of the T-unit as an index of overall development in second language acquisition.

In first language acquisition, the development of syntactic maturity--that is, of the ability to compress an increasingly large number of ideas, or chunks of information, into fewer words--is reflected by the longitudinal growth of T-unit length--a T-unit being defined as "a main clause plus all subordinate clauses and nonclausal structures attached to or embedded in it" (Hunt, 1970, 4). This growth is linear and uniform, since children's speech and writing contain longer T-units at any given age than at an earlier age, and syntactic maturity--language development, if you will--thus parallels other developmental patterns in the child. T-unit length, then, seems to provide an intuitively satisfying and stable index of first language development.

There are many who feel that while second language acquisition by adults does not parallel other developmental processes as in the case of first language acquisition, the development of syntactic maturity in a second language nonetheless proceeds much along the same lines as in first language acquisition. What has been needed is a yardstick by which to characterize growth in second language acquisition. Obviously, chronological age is of no value here, nor are anything like grade level norms available, given the heterogeneity of the second language learner population. The attractiveness of an index like mean T-unit length is two-fold: first, it would be a global measure of linguistic development external to any particular set of data--in other words, not an ad hoc measure--and second, it would allow for meaningful numerical comparisons between first and second language acquisition.

In the last few years, then, T-unit analysis has been applied in a variety of second language acquisition studies, involving a number of languages. Many researchers have expressed relative satisfaction with T-unit length and related measures as indices of second language development. At the same time, however, certain problems in T-unit analysis have been pointed out. These problems are in some cases definitional and in others procedural. Some relate to

T-unit analysis in general, while others are related specifically to the application of T-unit analysis to second language data. Other criticism has been of a more sweeping nature and can be seen as questioning the very use of measures derived from T-unit analysis as indices of overall development or proficiency in a first or second language.

The purpose of this paper is to review these criticisms and reservations, not for the purpose of dismissing them, nor for the opposite purpose of condemning T-unit analysis outright. Rather, the purpose is to set recent findings and claims about T-unit analysis into a proper perspective by addressing the following questions: 1) What are the main problems which have been encountered in T-unit analysis in general and in its application to second language data in particular? 2) Is the T-unit a valid measure of language development? 3) Finally, even if mean T-unit length is a valid index, is it a particularly useful one?

To begin with, there are a number of researchers who continue to be bothered by an index of syntactic complexity--for in fact syntactic maturity has always been intended to mean the ability to generate sentences of greater and greater complexity--based solely on an analysis of what can be loosely termed "surface structure." This criticism persists despite evidence that mean T-unit length reflects to a very great degree the transformational complexity of sentences (at least insofar as we are willing to equate the number of sentence-combining transformations involved in producing a surface structure with the notion of complexity) (O'Donnell, Norris, and Griffin, 1967) and despite the fact that a comparison of T-unit length with subsequent empirically-derived measures of syntactic complexity (Endicott, 1973; Golub and Kidder, 1974; Loban, 1976) led one researcher to conclude that T-unit length remained on an overall basis "the most useful and usable index of syntactic development" (O'Donnell, 1976, 38). Representative of this line of criticism is Ney (1966), who argues that while T-unit length reflects--"adjusts for" might be the better term--excessive coordination of sentences, it fails to deal with excessive coordination within a sentence. His argument, which is illustrated by the following pair of sentences:

> Then the rain falls and spring comes. (2 T-units)
> So he went through the woods and pulled the feather out of his hat from the partridges and put a flower in his hat and walked on through the woods. (1 T-unit)

is that it is essentially arbitrary to view coordination of sentences and coordination of noun phrases or verb phrases as being qualitatively different (Ney, 1966, 234-5).

Implicit in Ney's criticism is an issue to which I will return later: that is, whether an index based on syntactic complexity alone, divorced from considerations of appropriateness and stylistic effectiveness, can be a valid measure of overall language proficiency.

A definitional criticism of a very different nature has led to the modification of mean T-unit length as the primary index of second language development. A number of researchers (Scott and Tucker, 1974; Gaies, 1976; Larsen-Freeman and Strom, 1977; Larsen-Freeman, 1978; Vann, 1978) have recognized that errors, while not characteristic of first language data, do occur relatively frequently in adult second language data, and that an index of language growth ought in some way to reflect the incidence of developmental errors. The result has been a modification of the basic index; the length of error-free T-units is now considered to be a more valid measure of growth in a second language. Vann (1978), for example, found that while mean T-unit length does not correlate with TOEFL scores, both the mean length of error-free T-units and the ratio of error-free T-units to total T-units correlate significantly with TOEFL scores.

Certain problems remain, however, the first of which is to reach agreement on what constitutes an error. The most unambiguous position, although not necessarily the most fruitful one, is that taken by Larsen-Freeman and Strom (1977), who required that a T-unit be perfect in all respects, including spelling and punctuation, for it to be counted as "error-free." On the other hand, Scott and Tucker (1974) considered any T-unit free of morphological and syntactic errors to be error-free. An intermediate position is represented by Vann (1978), who required that a T-unit make sense in the given context and be free both of morpho-syntactic and lexical errors.

Without belaboring the point, I will simply argue that if the criterion of correct spelling and punctuation must be satisfied for a written T-unit to be classified as error-free, it would necessarily follow (for purposes of comparability) that the correct use of suprasegmentals, for example, should be a criterion for a spoken T-unit to be judged error-free. While this would certainly be of interest, it would also complicate the analytical process immeasurably, and it is the very ease and alleged objectivity of T-unit segmentation that are repeatedly cited as being among the chief strengths or advantages of T-unit analysis. To go one step further: even if consistency among researchers could be obtained regarding the definition of an error-free T-unit, there would still remain the question of whether or not

it would be worthwhile to establish a hierarchy of errors, since clearly different errors have different effects.

The fact that errors have to be accounted for by a modified index of language development in adult second language acquisition has an important implication. It amounts to a concession that there is a qualitative difference in the developmental processes of first and second language acquisition.

A far more sweeping criticism of T-unit analysis--one which goes beyond definitional and procedural weaknesses and which also pertains to other measures of syntactic complexity--concerns the validity of the T-unit as index of overall language development. The motivation for this criticism is perhaps best illustrated by the following pair of sentences from Moffett (1968, 174):

> I don't like what is left in the cup after you finish drinking. (3 T-units)
> I don't like the dregs. (1 T-unit)

Of the two T-units, the first is, superficially anyway, syntactically more complex by far. It contains almost two and a half times as many words as the second one and three times as many clauses. Should the writer of the first T-unit therefore be regarded as more proficient in English than the writer of the second? Or, alternatively, should the circumlocution in the first T-unit be regarded as evidence of restricted vocabulary development on the part of the writer of the first sentence?

In other words, how should communicative strategies such as circumlocution be evaluated in our assessment of an individual's overall proficiency? Critics argue that the T-unit fails to deal with this question. The weakness of T-unit analysis, they argue, lies in its treatment of syntax alone--and as the example indicates, syntax and vocabulary are closely related:

> One can only regard skeptically any efforts to measure sentence maturity by sentence complexity. Indeed, (this) casts doubt on the whole effort to evolve a theory of complexity in isolation from semantics and word concepts. Or at any rate a theory so derived seems doomed to superficiality (Moffett, 1968, 174).

This criticism is an important one in that it underscores the fact that there is no necessary correlation between syntactic complexity and quality or effectiveness--in other words, communicative competence--in speech or writing. On the other hand, the

criticism sets up a straw-man argument, for it suggests that those who use T-unit analysis regard syntactic complexity as being absolutely good, as a virtue in itself. This is not the case. Attempts to validate mean error-free T-unit length have used either standardized language proficiency test scores or language course level as criterion measures. To the degree that these are accepted as valid indicators of language proficiency, concurrent validity can be established. All that is claimed by T-unit analysis-based research is that learners considered to be at an advanced level by either of these other criteria tend to produce longer error-free T-units and a higher ratio of error-free T-units to total T-units. In other words, these studies simply claim that the ability to subordinate and to reduce clauses to non-clause embeddings is a characteristic of proficiency, and that the growth in this ability provides an index of development in the target language.

In the Appendix are written five alternative ways of saying the same thing. Some of the rewritings are clearly more syntactically complex than others. No one, however, would claim that any of the five is better than the others on an absolute basis. They represent a range of stylistic options, and some are more appropriate for certain contexts than for others. The index of development under scrutiny here reflects not whether a learner will use one style in preference to others in given contexts, nor whether the appropriate stylistic choice will be made for a given context--although these are important dimensions of language proficiency for which there unfortunately exists no single measuring instrument--but only whether the learner is capable of using not only the "simple" style of the first sentence but also the more complex stylistic devices of the others.

This very point, however, does suggest a problem with rewriting exercises, which have been used (Monroe, 1975; Gaies, 1976) to collect data. A rewriting exercise consists of a series of short sentences in connected discourse. Subjects are told to rewrite the passage in a "better" way by combining sentences, changing the order of words, and omitting words that are repeated too often. They are also cautioned not to leave out any information. The purpose of the exercise, of course, is to afford subjects abundant opportunities to subordinate sentences and to reduce sentences to non-clauses--in other words, to demonstrate their ability to write syntactically complex prose. At the same time, however, the potential variables of topic, content, vocabulary, and length are held relatively constant. The problem here is that the word "better" allows for a great deal of latitude in stylistic options. and two subjects who are equally adept at sentence-combining may interpret the task differently and produce rewritings of different

complexity.[2] This problem has been noted by Monroe (1975), and it is implicitly recognized by the need cited by Larsen-Freeman (1978) to compare free-writing and controlled rewriting samples from the same subjects. Given the problem, it would seem reasonable to demand that more than a single sample of speech or writing from each subject be used in further attempts to validate error-free T-unit length or related measures as indices of development.

Finally, the usefulness of T-unit analysis must be considered. To do this, we must first point out two limitations of this particular method of analysis. One is that it does not appear to be particularly appropriate for the analysis of data from subjects with relatively low proficiency. In the data of these subjects, grammatical and lexical errors are so frequent and of such a nature that they tend to interfere not only with the reader's or listener's understanding, but also with the researcher's ability to tabulate T-units (Larsen-Freeman and Strom, 1977; Vann, 1978). In other words, whereas an index like the mean number of morphemes per utterance (MLU) seems to be useful only <u>below</u> a certain level (approximately five morphemes per utterance) of language development (Schumann, 1976), T-unit analysis seems to be useful only <u>beyond</u> a certain level of development in the target language.

The second limitation has to do with the discriminating power of the T-unit. Length of error-free T-unit (and related measures) will distinguish learners with low proficiency from those with a high degree of proficiency, but it is not as sensitive an indicator of second language development as might be desired. In a number of studies (Monroe, 1975; Cooper, 1976; Larsen-Freeman and Strom, 1977; Larsen-Freeman, 1978), considerable overlapping between adjacent groups was noted. This is not the case with data in first language development. The difference may be due to the fact that while the ability to subordinate and embed sentences develops gradually over a number of years in first language acquisition, the process is by comparison far more compressed in adult second language acquisition (Cooper, 1976).

With these limitations in mind, we might now evaluate the usefulness of T-unit analysis. What insight does T-unit analysis provide about the nature of second language acquisition and its relationship to first language acquisition? First, it reflects the fact that in both cases, language development involves an increasing ability to incorporate and consolidate more information into a single grammatically interrelated unit--to put more chunks of information in a sentence. In addition, evidence has been provided (Monroe, 1975) to suggest that not only the process of T-unit

lengthening, but also the stages in that process, are consistent in first and second language acquisition. In both cases, sentences tend to be combined first by coordination primarily. Subordination is more heavily used at the next stage of development; and finally, sentence-embedding and clause reduction become the principal means of consolidating and structuring information.

At the same time, however, T-unit analysis also reflects the fact that, as already mentioned, the duration of the process is far shorter in adult second language acquisition than in first language acquisition. This difference is generally attributed to the fact that the adult, by definition, approaches the second language acquisition task as a cognitively mature individual, whereas in the case of first language acquisition, language development parallels--to a large degree necessarily--cognitive and other developmental patterns.

However satisfactory this explanation may be, it does not account for another difference--this one qualitative--which is reflected by T-unit analysis. Errors occur in second language data that either do not occur in first language data, as is usually the case, or that occur far less frequently. As mentioned above, the very development of a modified index--the mean length of error-free T-units (along with the ratio of error-free T-units to total T-units)--underscores this difference.

These are not new insights, and no one would claim that T-unit analysis provides a means by which longstanding issues such as the relationship between first and second language acquisition can be resolved. But at the very least, it provides another lens, so to speak, through which relevant empirical data can be usefully viewed. While it is a tool of which second language researchers should be aware, it should nonetheless be the object neither of unreasonable expectations nor of exaggerated claims.

NOTES

[1] Besides its use in the investigation of the development of syntactic maturity in first and second language acquisition, T-unit analysis has been applied in a large number of other research areas: linguistic input and teachers' classroom language (Gaies, 1977; Steyaert, 1977; Chaudron, 1978); readability (Street, 1971; Gaies, 1979); the influence of mode on writing and speaking style (San Jose, 1972; Pope, 1974); the relationship between ethnic or socio-economic background and oral speech (Pope, 1971); and most significantly, at least from a quantitative point of view, the development, use, and assessment of sentence-combining as a curricular activity designed to accelerate syntactic maturity (consult any recent volume of Research in the Teaching of English).

[2] A similar problem can occur if in a cross-sectional or longitudinal study, mode of discourse, which has been identified as a variable affecting syntactic complexity (San Jose, 1972), is not controlled.

REFERENCES

Chaudron, Craig. 1978. "English as the medium of instruction in ESL classes: An initial report of a pilot study of the complexity of teachers' speech." Unpublished paper, Modern Language Centre, Department of Curriculum, Ontario Institute for Studies in Education.

Cooper, Thomas C. 1976. "Measuring written syntactic patterns of second language learners of German." Journal of Educational Research 69, 176-83.

Endicott, A. L. 1973. "A proposed scale for syntactic density." Research in the Teaching of English 7, 5-12.

Gaies, Stephen J. 1976. "Sentence-combining: A technique for assessing proficiency in a second language." Paper read at the Conference on Perspectives on Language, University of Louisville, Louisville, Kentucky, May 6-8. (ERIC ED 130 512)

_____. 1977a. "A comparison of the classroom language of ESL teachers and their speech among peers: An exploratory syntactic analysis." Unpublished Ph.D. thesis, Indiana University.

_____. 1977b. "The nature of linguistic input in formal second language learning: Linguistic and communicative strategies in ESL teachers' classroom language, in On TESOL 77: Teaching and learning English as a second language. (Brown, H. D., Crymes, R. H., and C. A. Yorio, eds.) Washington, D.C.: Teachers of English to Speakers of Other Languages, 204-12.

_____. 1979. "Linguistic input in formal second language learning: The issues of syntactic gradation and readability in ESL materials." TESOL Quarterly 13.

Golub, Lester and Carole Kidder. 1974. "Syntactic density and the computer." Elementary English 51, 1128-31.

Hunt, Kellogg W. 1965. Grammatical structures written at three grade levels. Research Report No. 3. Urbana, Illinois: National Council of Teachers of English.

_____. 1970. "Syntactic maturity in school children and adults." Monographs of the Society for Research in Child Development 53:1 (Serial No. 134).

Larsen-Freeman, Diane, and Virginia Strom. 1977. "The construction of a second language acquisition index of development." Language Learning 27, 123-34.

Larsen-Freeman, Diane. 1978. "An ESL index of development." Paper read at the Twelfth Annual TESOL Convention, Mexico (D.F.), April 4-9.

Loban, Walter. 1976. Language development: Kindergarten through grade twelve. Research Report No. 18. Urbana, Illinois: National Council of Teachers of English.

Moffett, James. 1968. Teaching the universe of discourse. Boston: Houghton Mifflin Company.

Monroe, James H. 1975. "Measuring and enhancing syntactic fluency in French." The French Review 48, 1023-31.

Ney, James W. 1966. "Review of 'Grammatical structures written at three grade levels' (Hunt, K.W.)." Language Learning 16, 230-5.

O'Donnell, Roy C. 1976. "A critique of some indices of syntactic maturity." Research in the Teaching of English 10, 31-8.

_____, Norris, R. C., and W. J. Griffin. 1967. Syntax of kindergarten and elementary school children: A transformational analysis. Research Report No. 8. Urbana, Illinois: National Council of Teachers of English.

Pope, Mike. 1971. "Syntactic maturity of black and white fourth graders' speech." Research in the Teaching of English 5, 202-18.

_____. 1974. "The syntax of fourth graders' narrative and explanatory speech." Research in the Teaching of English 8, 219-27.

San Jose, Christine. 1972. "Grammatical structures in four modes of writing at fourth-grade level." Unpublished doctoral dissertation, Syracuse University.

Schumann, John. 1976. "Second language acquisition research: Getting a more global look at the learner." Language Learning (Special Issue No. 4: Papers in Second Language Acquisition), 15-28.

Scott, M., and G. R. Tucker. 1974. "Error analysis and English-language strategies of Arab students." Language Learning 24, 69-97.

Steyaert, Marcia. 1977. "A comparison of the speech of ESL teachers to native speakers and non-native learners of English." Paper read at the Winter Meeting of the Linguistic Society of America, Chicago, Illinois.

Street, John H. 1971. "Readability of UCLA materials used by foreign students." Unpublished M.A. thesis, University of California, Los Angeles.

Vann, Roberta J. 1978. "A study of the oral and written English of adult Arabic speakers." Unpublished Ph.D. dissertation, Indiana University.

APPENDIX

	ALTERNATIVE	T-Units	w/T	c/T	w/c
1.	I've known this woman for a long time. We can rely on her. I am confident of that. She'll get the job done.	4	6.25	1.00	6.25
2.	This woman will get the job done. I've known her for a long time, so I am confident we can rely on her.	3	8.00	1.33	6.00
3.	This man--and I've known him for a long time, so I'm confident that we can rely on him--will get the job done.	3	8.67	1.33	6.50
4.	This man will get the job done. I am confident that we can rely on him, because I've known him for a long time.	2	12.50	2.00	6.25
5.	This woman, whom I've known for a long time and whom I feel confident we can rely upon, will get the job done.	1	24.00	3.00	8.00

w/T = mean number of words per T-unit
c/T = ratio of total clauses to main clauses
w/c = mean number of words per clause